APPARATUS FOR HOLDING AND OPERATING ONE OR MORE SYRINGES

TECHNICAL FIELD

This invention relates to syringes. In particular, the invention relates to a device for holding one or more syringes to facilitate operation of a single syringe or to operate and combine the fluids from a plurality of syringes.

BACKGROUND ART

The operation of a syringe is well known. In a common use, a hypodermic needle is attached to the barrel of a syringe for injecting a fluid into a patient. Syringes also have other uses, such as the application of a fluid to an exterior surface or the injection of a fluid into a conduit.

It is also known to combine the fluids from two separate syringes for application of the mixture to an object. An example of this is the combination of a first fluid containing fibrinogen in a first syringe and a second fluid containing thrombin in a second syringe to provide a fibrin sealant. This type of syringe typically provides a combining tip having two inlets, each of which receives the outlet of a respective one of two syringes. The combining tip provides a Y-type channel for combining the two fluids.

A problem in this art is how to facilitate handling the syringes and, in particular, how to handle two or more syringes such that they can be operated simultaneously with ease. In this regard, it is often desirable to link the syringe barrels and the syringe plungers to allow the operator to apply the contents in a controlled manner with one hand.

It may also be desirable to provide for operation of a single syringe by using the thumb to obtain more leverage on the end of the plunger.

A further requirement of devices in this art is that the components be inexpensive, easily sterilized, and disposable.

SUMMARY OF THE INVENTION

In accordance with the invention, a one-piece molded plastic handle receives the barrel of a first syringe for securely holding it in a position whereby the user may grip the handle and operate the plunger with the thumb. A clip is also provided for connecting the plunger of a syringe placed in the handle to the plunger of one or more additional syringes.

In use, the outlet ends of the syringes are attached to any of several applicator tips that are commercially available for combining fluids from two or more syringes. Thus, the luer lock tips at the outlet ends of the syringes are secured to the applicator tip while the plungers at the opposite ends are secured to the clip provided by the invention to result in a rigid assembly, with the syringe barrels essentially parallel.

One of the syringes is held in the handle so that the operator can operate the syringes simultaneously with the thumb by grasping the handle and pushing on the clip with the thumb.

The syringes may be of the same size, which would provide a 1:1 mixture ratio of the fluids. Or, the syringes may be of different sizes to provide another desired mixing ratio. For example, if the first syringe has a 10ml capacity, and a second syringe has a 1ml capacity, the mixing ratio will be 10:1. Syringes of different sizes are easily accommodated because the handle holds only a single syringe, and the remaining

syringes are held to the first by the applicator and the clip. By this construction, different sizes of syringes can accommodated with a single handle by using a clip specifically designed to engage the plungers of the syringes. The preferred handle includes a cradle sized to receive the barrel of a 10ml syringe. The cradle is open at the top so the barrel can be snapped into the handle from the top or slid in from either end. The cradle can be a cylinder, which may require an adaptor for receiving barrels of different sizes.

The handle also preferably provides a storage bay for one or more clips, which may be of different sizes or may be redundant in case one is dropped during assembly.

In the preferred embodiment, the handle and the slips are injection-molded polypropylene of a grade that withstands sterilization by irradiation or ethylene oxide gas.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side view of an apparatus for holding one or more syringes in accordance with the invention.

Figure 2 is a side view of the apparatus of figure 1 with an applicator tip attached to the syringes.

Figure 3 is a side view of an apparatus in accordance with the invention with an alternate clip.

Figure 4a is an end view of a preferred embodiment of a handle in accordance with the invention.

Figure 4b is an end view of an alternate embodiment of a handle in accordance with the invention.

Figure 5a is a side view of a handle showing storage of the clips.

Figure 5b is a perspective of the embodiment of figure 5a.

Figure 6 is a side view of the embodiment shown in figure 4b showing an adaptor for accommodating syringes of different sizes.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to figure 1, a preferred embodiment of the invention includes a handle 2, which is designed with a cradle portion 4 for receiving a first syringe 6. The handle provides a grip for engaging the palm of a user in such a configuration that the thumb of the user is positioned to engage easily the plunger 8 of the syringe 6. A second syringe 10 is held parallel to the first syringe by structure to be described. Each syringe has a luer lock 7 and 9, respectively, for connecting the syringes to conduits, or the like.

With reference to figure 2, an applicator tip 12 is shown connected to the luer lock ends of the first and second syringes 6 and 10. This applicator is one of several known in the art for combining the fluids from the first and second syringes to provide a mixture of the fluids from the two syringes. More than two syringes may be employed with an appropriate applicator tip.

Figure 2 also shows use of a clip 14, which is secured to the ends of the syringe plungers such that a user can operate the syringes simultaneously by pressing on the clip 14. The clip 14 can be stepped to provide attachment parts of different thickness to accommodate syringes of different lengths. Thus, the clip shown in figure 2 provides a first portion 15 that is thicker than a second portion 17 by the difference between the lengths of the two syringes 6 and 10. Figure 3 shows an alternate clip 13 of uniform thickness, to be used when the syringes are of the same length.

Figure 4a is an end view of a handle 2 having a cradle 4 designed to receive a syringe barrel either by insertion from above the cradle in a downward direction or by

longitudinally sliding the syringe barrel into the cradle. In this embodiment, the sides 16 of the cradle project inward and downward slightly and are resilient to receive the barrel of a syringe 6 and hold it securely to the handle. Radial ribs 17 are spaced about the cradle 4 for engaging the syringe and providing secure support by the cradle. In this embodiment, the barrel can be inserted in a direction transverse to the longitudinal axis of the barrel or slid longitudinally into the barrel.

Figure 4b shows an alternate embodiment wherein the cradle is designed to receive the barrel only by sliding it longitudinally into the cradle.

Figure 5a is a side view of the invention showing how spare clips 14 are stored in an open cavity formed by the sides of the handle. In the preferred embodiment, each of the clips has an opening 18 for receiving a post 20 on the handle to hold the clip to the handle such that a user can readily remove the clip from its storage position. The post is preferably cruciform in cross section for resiliently holding the clip.

Figure 5b is a perspective showing two clips stored in the handle. It will be appreciated that each clip includes front and back walls forming two adjacent slots 24, each of which receives a flange on the end of a respective syringe plunger. The front wall is cut out at 26 to accept the plunger's shaft. The slots are preferably directed oppositely, whereby the plungers are inserted from opposite ends of the clip to accommodate the natural tendency of the syringes to come toward each other.

Figure 6 shows how a handle, such as that shown in figure 4b, can be adapted to receive syringes of different sizes. In this embodiment, an adaptor 22 is provided for altering the size of the cradle to receive a syringe having a diameter smaller than the

largest nominal size to be retained by the cradle. A plurality of these adaptors may be provided to accommodate syringes of various sizes.

In use, the syringes may be assembled in almost any order. In one procedure, the applicator tip is secured to the syringes, the syringe 6 is inserted into the cradle 4, and the clip attached. Alternatively, the syringe 6 is inserted into the handle, and the applicator tip, second syringe and clip are then attached. The parts may be assembled in other orders also.

It will be appreciated that a novel for holding and operating one or more syringes has been described. Modifications within the scope of the appended claims will be apparent to those of skill in the art.